

## \* NOTICES \*

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3. In the drawings, any words are not translated.

## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the resin for printing ink suitable for the un-aromatic system ink solvent

[Description of the Prior Art] Conventionally, the aromatic content solvent has been used as a solvent used for printing ink and a paint. However, environmental problems, such as air pollution, and the problem of the safe health of a work environment by the organic solvent are pointed out, and the substitution to the un-aromatic system ink solvent which, in response, makes a part for a naphthene and a paraffin content a subject is considered in recent years. However, such an un-aromatic system ink solvent has the fault of being very deficient in the solvent power to rosin denaturation phenol resin. For example, the aniline point of this solvent is high around 12-16 degrees C as compared with the aromatic system ink solvent of this boiling range. Therefore, in conventional rosin denaturation phenol resin, only by replacing by this solvent of this boiling point as it is, solvent power is insufficient and it causes a fall and poor printability of the gloss of printing ink.

[0002] Moreover, in order to satisfy high-speed aptitude, such as misting-proof nature, as improvement in the speed of a print speed progresses in recent years, macromolecule quantification of the resin for ink is becoming indispensable. That is, as compared with conventional rosin denaturation phenol resin, to the un-aromatic system ink solvent, high solubility is shown and development of the resin for printing ink with high molecular weight is desired. A method and (2) using the phenol which has an alkyl group not more than C9 as a phenol component of (1) rosin denaturation phenol resin conventionally as a means which raises the solubility of rosin denaturation phenol resin so much. The method of using together linear reforming components, such as a higher fatty acid, drying-oil alkyd resin, and drying oil, etc. has been adopted. However, generally, gloss, and dryness and a misting are opposite performances, it is difficult to balance these many properties in many cases, and it has the inclination for dryness to become slow and for misting-proof nature to fall by any above-mentioned means.

[0003] Moreover, the pyrogenetic reaction of rosin and the resol type phenol resin which comes to use at least one sort of phenol components chosen from an octyl phenol and a nonyl phenol is carried out to the bottom of existence of an acid catalyst, the acid number is lowered, and the resin for printing ink which makes solubility come to improve is indicated by JP,59-191776,A. The resol type phenol resin (B) which used the alkylphenols which have the reactant (A) which similarly rosin and phenols are made to react under existence of an acid catalyst, and is obtained, and the alkyl group of carbon numbers 4-12 is made to react under existence of an acid catalyst, the acid number is lowered, and the resin for printing ink which makes solubility come to improve is indicated by JP,1-275677,A. However, although each resin for printing ink obtained with these means is excellent in solubility, the molecular weight which is sufficient for high-speed fitness being satisfied is not obtained. Although for the reason polyhydric alcohol, epoxy, etc. are used together and macromolecule quantification can be performed, the solubility of these resins has the disadvantage which falls greatly. A deer is carried out, sufficient solubility is held at the time of use of an un-aromatic system ink solvent, and development of the resin for printing ink with which are simultaneously satisfied of military requirements (henceforth a printability), such as a high-gloss and drying-property, set, high-speed fitness (misting-proof nature), and emulsification property, is demanded.

[0004]

[Problem(s) to be Solved by the Invention] This invention persons are going to develop the new rosin denaturation phenol resin which can solve this technical problem in view of the actual condition that it cannot be satisfied [ with the conventionally well-known rosin denaturation phenol resin which pointed to the improvement in gloss ] of a printability in use of the solvent for un-aromatic system ink.

[Means for Solving the Problem] In view of the above-mentioned technical problem, this invention persons inquired wholeheartedly to find out the rosin denaturation phenol resin which can offer a purposiveness-like offset-printing ink constituent. Consequently, when the following specific resultant was used as a binder resin, the fact that the outstanding printing ink constituent corresponding to this purpose could be acquired easily was found out. this invention is completed for the first time based on this new knowledge

[0005] That is, the weight average molecular weight to which it comes to carry out the pyrogenetic reaction of the resol type phenol resin which comes to use rosin and the phenols which have the alkyl group of C10-C20, and the polyhydric alcohol under existence of an acid catalyst is rosin denaturation phenol resin of 30,000-250,000, and this invention relates to the rosin denaturation phenol resin to which the solubility of this resin is characterized by not producing muddiness at 25 degrees C in 30 or less % of the weight of this solution to the aliphatic hydrocarbon solvent of a carbon number 15.

[0006] The rosin denaturation phenol resin of this invention makes an indispensable component rosin (henceforth a component (A)), resol type phenol resin (henceforth a component (B)), polyhydric alcohol (henceforth a component (C)), and an acid catalyst (henceforth a component (D)). As a component (A), a gum rosin, tall oil rosin, a wood rosin, disproportionation rosin, polymerization rosin, its denaturation object, etc. are mentioned here.

[0007] As phenols of a component (B), for example 4-desyl phenol, 4-(1-butyl hexyl) phenol, 4-(1-methyl nonyl) phenol, 4-(1-ethyl octyl) phenol, 4-(1-propyl heptyl) phenol, 4-(1-ethyl-1-methyl heptyl) phenol, 4-[1-methyl-1-(1-methylethyl) hexyl] phenol, 4-(1 and 1-dimethyl octyl) phenol, 4-[1-methyl-1-(1-methylpropyl) pentyl] phenol, 4-undecyl phenol, 4-(1-pentyl hexyl) phenol, 4-(1-methyl desyl) phenol, 4-(1-ethyl nonyl) phenol, 4-(1-propyl octyl) phenol, 4-(1-butyl heptyl) phenol, 4-dodecyl phenol, 4-(1, 1, 3, 3, 5, and 5-hexa methyl hexyl) phenol, 4-(1-ethyl desyl) phenol, 4-(1-propyl nonyl) phenol, 4-(1-butyl octyl) phenol, 4-(1-pentyl heptyl) phenol, A 4-(1-methyl undecyl) phenol 4-(1 and 1-dimethyl desyl) phenol, 4-(1, 3, 5, 7-tetramethyl octyl) phenol, 4-tridecyl phenol, 4-(1-propyl desyl) phenol, 4-(1-butyl nonyl) phenol, 4-(1-pentyl octyl) phenol, 4-(1-hexyl heptyl) phenol, 4-(methyl dodecyl) phenol, 4-tetradecyl phenol, 4-pentadecyl phenol, a 4-hexadecyl phenol, 4-(1-methyl pentadecyl) phenol, 4-(1-hexyl desyl) phenol, 4-(1-butyl dodecyl) phenol, 4-(1-propyl tridecyl) phenol, 4-(1-ethyl tetradecyl) phenol, 4-(1-heptyl nonyl) phenol, 4-(1-pentyl undecyl) phenol, A 4-heptadecyl phenol, 4-octadecyl phenol, 4-(1-methyl heptadecyl) phenol, a 4-nona desyl phenol, 4-AIKO sill phenol, 4-(1-methyl nona desyl) phenol, etc. can be illustrated. Moreover, this invention is not necessarily limited only to the alkylphenol of C10-C20, and can be used together with the usual general-purpose phenols, for example, a carbolic acid, cresol, butylphenol, a p tert amylphenol, an octyl phenol, a nonyl phenol, a phenylphenol, a cumyl phenol, etc. However, if the amount used, such as a carbolic acid, cresol, butylphenol, and a cumyl phenol, increases too much in remainder, solubility will fall in many cases.

[0008] Formaldehyde or a paraformaldehyde is raised as an aldehyde component of a component (B). The 1-4 mols of the amount used to the phenol component of an aldehyde are preferably made into 1.5-3 mols to one mol of phenol components. Resol type phenol resin is well-known, is made to react under existence of an alkali catalyst, and is obtained. as an alkali catalyst -- sodium, calcium, zinc, a potassium, and magnesium etc. -- an oxide, a hydroxide, acetate or ammonia, a low-grade organic amine, etc. raise -- having -- these -- a phenol component -- receiving -- 0.1 - 5 % of the weight -- it comes out comparatively and is used Both the amount of the component (B) used is suitably determined in consideration of the solubility of the rosin denaturation phenol resin obtained, and softening temperature. the amount of the component (B) used -- the (Component A) 100 weight section -- receiving -- usually -- a 30 - 120 weight section grade -- it considers as the 40 - 100 weight section preferably Since solubility becomes good too much in being unable to obtain the rosin denaturation phenol resin which has the target solubility when the amount of this [ used ] does not fulfill 30 weight sections and exceeding the 120 weight sections, a set and a misting get worse and neither is desirable. especially limitation is carried out as a component (C) -- not having -- various kinds -- a well-known thing can be used and a glycerol, trimethylolethane, a trimethylol propane, a diethylene glycol, a pentaerythritol, etc. are mentioned as the example

[0009] 0.2 mols - the 0.7 mols of the amount of the component (C) used are preferably made into 0.3 to 0.6 mols to the (Component A) 1 mol amount used. When rosin denaturation phenol resin with the target molecular weight is not obtained when the amount of this [ used ] does not fulfill 0.2 mols, and exceeding 0.7 mols, rosin denaturation phenol resin with the target solubility is not obtained. As a component (D), mineral acids, such as sulfonates, such as Para toluenesulfonic acid, dodecylbenzenesulfonic acid, methansulfonic acid, and ethane sulfonic acid, or a sulfuric acid, and a hydrochloric acid. are raised, and it considers as 0.01 - 2 weight sections grade to a total of 100 weights sections of a component (A) and (B) as the amount used. In this invention, as long as the aforementioned component is used the specified quantity every, especially the reaction method is not limited, but adopts the manufacture method of well-known rosin denaturation phenol resin as it is conventionally, and can acquire the resin for ink of this invention easily.

[0010] Moreover, as for the solubility of the rosin denaturation phenol resin of this invention, it is desirable for the solubility which used the aliphatic hydrocarbon solvent of a carbon number 15 to be 30 or less % of the weight at 25 degrees C. The method of expressing solubility carries out dropping churning of the resin in 25 degrees C after the heating dissolution with the solvent to be used, and its system is white and it displays a solvent with resin weight % in the solution of the point which begins to become muddy. Therefore, resin weight % of the point that the better resin of compatibility becomes cloudy becomes low. In addition, the example of this specification was shown with the solubility measured using the normal heptadecane of a carbon number 15. molecular weight of the rosin denaturation phenol resin of this invention 30,000-250,000 -- it is preferably carried out to 40,000 to about 200,000 It is for misting-proof nature to fall to the case of less than 30,000 notably. In addition, especially the softening temperature of this resin is usual although not restricted. 120 degrees C or more are preferably made into about 120-200 degrees C. It is for a drying property and a set to fall notably in the case of less than 120 degrees C. the method usual in the rosin denaturation phenol resin of this invention obtained in this way -- various kinds -- it can consider as printing ink by blending suitably various additives, such as a well-known pigment, an un-aromatic system solvent, drying oil, an abrasion-resistance improver, and a dryer, etc., and \*\*\*\*(ing) them It can be used for offset printing, and also especially this ink can be used suitable also for water-less lithography, Toppan Printing, and gravure. In addition, it is a book in the case of the above-mentioned ink manufacture.

[0011]

[Example] Hereafter, an example explains this invention. In addition, the section and % are weight section and weight %s among an example, respectively.

Example of manufacture 1 (process of the initial condensate of resol type phenol resin) agitator, a reflux condenser with a

water separator, In the 4 TSU mouth flask which attached the thermometer, the 4-(1 and 1-dimethyl octyl) phenol 1000 section, The mixture which consists of the formalin 875 section and 93% sodium-hydroxide 60 section 35% is heated at 90 degrees C. After making it react for 3 hours, the toluene of the 1000 sections is added, a resin is dissolved in toluene, the solution of hydrochloric acid of the 6-N hydrochloric-acid 125 section and the water 1000 section is added and put [ agitate and ], and the supernatant layer of PHs 5-6 is taken out and rinsed. Toluene solution the about 2000 sections of resol type phenol resin (initial condensate) A of 50% of nonvolatile matters were obtained.

[0012] At the process shown in the example 1 of example of manufacture 2 manufacture, except having changed 4-(1, 1 dimethyl octyl) phenol into 4-(1, 1, 3, 3, 5, and 5-hexa methyl hexyl) phenol, same operation was performed and toluene solution the about 2000 sections of resol type phenol resin (initial condensate) B of 50% of nonvolatile matters were obtained.

At the process shown in the example 1 of example of manufacture 3 manufacture, except having changed 4-(1, 1 dimethyl octyl) phenol into 4-pentadecyl phenol, same operation was performed and toluene solution the about 2000 sections of resol type phenol resin (initial condensate) C of 50% of nonvolatile matters were obtained.

At the process shown in the example 1 of example of manufacture 4 manufacture, except having changed 4-(1 and 1-dimethyl octyl) phenol into 4-(1-methyl pentadecyl) phenol, same operation was performed and toluene solution the about 2000 sections of resol type phenol resin (initial condensate) D of 50% of nonvolatile matters were obtained.

[0013] At the process shown in the example 1 of example of manufacture 5 manufacture, except having changed 4-(1, 1 dimethyl octyl) phenol into 4-(1-methyl nona desyl) phenol, same operation was performed and toluene solution the about 2000 sections of resol type phenol resin (initial condensate) E of 50% of nonvolatile matters were obtained.

At the process shown in the example 1 of example of manufacture 6 manufacture, except having changed 4-(1, 1 dimethyl octyl) phenol into 4-octyl phenol, same operation was performed and toluene solution the about 2000 sections of resol type phenol resin (initial condensate) F of 50% of nonvolatile matters were obtained.

It heated making the 4 TSU mouth flask which attached example 1 agitator and the RIBIHHI cooling pipe thermometer distill off Para toluenesulfonic acid 3 section preparation and toluene as the gum-rosin 1000 section, the resol type phenol resin A1200 section (an equivalent for the phenol resin 600 section), the glycerol 40 section, and a catalyst, the reaction was performed at 250-260 degrees C for 3 hours, and rosin denaturation phenol resin the about 2000 sections of the acid number 20, the softening temperature of 169 degrees C, and 25% of points of a normal pentadecane

[0014] In two to example 5 example 1, it was used, having changed used resol type phenol resin A into the composition shown in Table 1, and also reacted similarly, and the rosin denaturation phenol resin of this invention was obtained. A resin constant is shown in Table 1.

In six to example 8 example 1, the amount of this phenol resin used was used for the composition which shows used resol type phenol resin A in Table 1 again, having changed, as shown in Table 1, and also it reacted similarly, and the rosin denaturation phenol resin resin of this invention was obtained. A resin constant is shown in Table 1.

In nine to example 10 example 1, the amount of the glycerol used again was used for the composition which shows used resol type phenol resin A in Table 1, having changed, as shown in Table 1, and also it reacted similarly, and the rosin denaturation phenol resin resin of this invention was obtained. A resin constant is shown in Table 1.

[0015] In 11 to example 12 example 1, it was used, having changed used resol type phenol resin A into the composition shown in Table 1, and also reacted similarly, and the rosin denaturation phenol resin resin of this invention was obtained. A resin constant is shown in Table 1.

In one to example of comparison 3 example 1, the amount of the glycerol used again was used for the composition which shows used resol type phenol resin A in Table 1, having changed, as shown in Table 1, and also it reacted similarly, and the resin for comparison was obtained. A resin constant is shown in Table 1.

In example of comparison 4 example 1, the amount and the amount of Para toluenesulfonic acid of a glycerol which are used again were used for the composition which shows used resol type phenol resin A in Table 1, having changed, as shown in Table 1, and also it reacted similarly, and the resin for comparison was obtained. A resin constant is shown in Table 1.

In five to example of comparison 6 example 1, the amount of the glycerol to be used was used for the composition which shows the used resol type phenol resin in Table 1 again, having changed, as shown in Table 1, and also it reacted similarly, and the resin for comparison was obtained. A resin constant is shown in Table 1.

[0016]

[Table 1]

|       | 樹脂組成        |       |     | 樹脂恒数   |      |         |
|-------|-------------|-------|-----|--------|------|---------|
|       | フェノール種/量    | グリセリン | PTS | 溶解性(%) | 分子量  | 軟化点(°C) |
| 実施例 1 | A/1200      | 40    | 3   | 25     | 6.9万 | 169     |
| 2     | B/1200      | 40    | 3   | 20     | 8.1万 | 167     |
| 3     | C/1200      | 40    | 3   | 12     | 10万  | 163     |
| 4     | D/1200      | 40    | 3   | 6      | 11万  | 163     |
| 5     | E/1200      | 40    | 3   | 5以下    | 10万  | 158     |
| 6     | B/1600      | 40    | 3   | 15     | 10万  | 169     |
| 7     | C/1600      | 40    | 3   | 8      | 12万  | 160     |
| 8     | E/1600      | 40    | 3   | 5以下    | 11万  | 154     |
| 9     | A/1200      | 20    | 3   | 16     | 4.2万 | 165     |
| 10    | D/1200      | 20    | 3   | 5以下    | 4.7万 | 160     |
| 11    | B+F/600+600 | 40    | 3   | 25     | 7.2万 | 170     |
| 12    | E+F/600+600 | 40    | 3   | 6      | 8.8万 | 163     |
| 比較例 1 | F/1200      | -     | 3   | 5      | 1.3万 | 169     |
| 2     | F/1200      | 40    | 3   | 白濁     | 4.3万 | 171     |
| 3     | F/1600      | -     | 3   | 5以下    | 1.5万 | 168     |
| 4     | F/1200      | 100   | -   | 白濁     | 6.8万 | 174     |
| 5     | A/1200      | -     | 3   | 5以下    | 1.5万 | 165     |
| 6     | D/1200      | -     | 3   | 5以下    | 2.1万 | 162     |

[0017] (Ink manufacture) They are 3 rolls after mixing about the pigment (carmine 6B) 20 section Nippon Oil AF solvent No. 7 13 sections to the rosin denaturation phenol resin 47 obtained section, the linseed-oil 20 section and the Nippon Oil AF solvent No. (Nippon Oil Co., Ltd. make) 7 31.6 section, and the gel varnish 67 section that consists of AL-CH(gelling agent made from \*\*\*\* fine chemicals) 1 1.6. It \*\*\*\*(ed), and it adjusted suitably so that the tuck value of ink might be set to 6.0\*\*0.5 and a flow value might be set to 20\*\*0.5. \*\*\*\* was shown in Table 2 at the existence of generating of the gloss of the ink obtained in each example and the example of comparison, a setting time, and a misting. The method of the performance test of ink is as follows.

[0018]

[Table 2]

|       | 光沢 | セット(分) | ミストンク |
|-------|----|--------|-------|
| 実施例 1 | 50 | 2      | 発生せず  |
| 2     | 51 | 2      | 発生せず  |
| 3     | 52 | 2.5    | 発生せず  |
| 4     | 53 | 2.5    | 発生せず  |
| 5     | 56 | 3      | 発生せず  |
| 6     | 54 | 2.5    | 発生せず  |
| 7     | 57 | 3      | 発生せず  |
| 8     | 59 | 3      | 発生せず  |
| 9     | 52 | 2.5    | 発生せず  |
| 10    | 56 | 3      | 発生せず  |
| 11    | 50 | 2      | 発生せず  |
| 12    | 53 | 2.5    | 発生せず  |
| 比較例 1 | 50 | 3      | 発生する  |
| 2     | 38 | 2.5    | 発生せず  |
| 3     | 53 | 3      | 発生する  |
| 4     | 35 | 2.5    | 発生せず  |
| 5     | 52 | 3      | 発生する  |
| 6     | 53 | 3.5    | 発生する  |

[0019] (Performance test)

Light \*\*: After carrying out drawdown of the ink 0.3cc to coat paper with RI circuit tester (Made in the Ming Factory), it dried for 3 seconds in 160-degree-C oven, and measured with the 60 degree-60 degree glossmeter.

Set: After carrying out drawdown of the ink 0.3cc to coat paper with RI circuit tester, the drawdown object was put in into the dryer of the 160-degree-C \*\* style, and the lost time (second) was measured.

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[Translation done.]

|   | L # | Hits        | Search Text                           | DBs   | Time Stamp |
|---|-----|-------------|---------------------------------------|---|------------|
| 1 | L1  | 105235<br>4 | @pd>20020123                          | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO; 2002/10/08<br>DERWEN 06:28<br>T;<br>IBM_TD<br>B |            |
| 2 | L2  | 1071        | ((523/160) or<br>(523/161)).CCLS.     | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO; 2002/10/08<br>DERWEN 06:28<br>T;<br>IBM_TD<br>B |            |
| 3 | L3  | 1044        | ((524/841) or<br>(524/594)).CCLS.     | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO; 2002/10/08<br>DERWEN 06:28<br>T;<br>IBM_TD<br>B |            |
| 4 | L4  | 152         | ((525/44.44) or<br>(525/501.5)).CCLS. | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO; 2002/10/08<br>DERWEN 06:28<br>T;<br>IBM_TD<br>B |            |
| 5 | L5  | 127         | ((527/602) or<br>(527/603)).CCLS.     | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO; 2002/10/08<br>DERWEN 06:28<br>T;<br>IBM_TD<br>B |            |

|    | L # | Hits | Search Text   | DBs  | Time Stamp          |
|----|-----|------|---|--|---------------------|
| 6  | L6  | 1145 | ((528/161) or (528/137) or (528/145) or (528/146) or (528/129)).CCLS. | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:28 |
| 7  | L7  | 86   | 1 and 2   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:28 |
| 8  | L8  | 7    | 1 and 3   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:28 |
| 9  | L9  | 1    | 1 and 4   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:28 |
| 10 | L10 | 0    | 1 and 5   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:28 |

|    | L # | Hits | Search Text   | DBs  | Time Stamp          |
|----|-----|------|---|--|---------------------|
| 11 | L11 | 9    | 1 and 6   | USPAT;<br>US-PGF<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:35 |
| 12 | L12 | 55   | (7 8 9 10 11) and (phenol<br>or phenolic)   | USPAT;<br>US-PGF<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:36 |
| 13 | L13 | 43   | 12 and pressure   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>E | 2002/10/08<br>06:39 |
| 14 | L14 | 2252 | (phenol or alkylphenol or<br>Sylphenol) and<br>(formaldehyde or<br>paraformaldehyde or<br>formalin) and pressure and<br>1                                       | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>D | 2002/10/08<br>07:39 |
| 15 | L15 | 1147 | (polyhydric adj alcohol or<br>glycerin or pentaerythritol<br>or (ethylene or diethylene)<br>adj glycol or<br>trimethylolethane or<br>trimethylolpropane) and 14 | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:55 |



|    | L # | Hits   | Search Text   | DBs  | Time Stamp          |
|----|-----|--------|---|--|---------------------|
| 16 | L17 | 220752 | (polyhydric adj alcohol or glycerin or pentaerythritol or (ethylene or diethylene) adj glycol or trimethylolethane or trimethylolpropane) | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:42 |
| 17 | L18 | 219    | 17 near10 (phenol or alkylphenol or Sylphenol) near10 (formaldehyde or paraformaldehyde or formalin) and pressure                         | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:44 |
| 18 | L19 | 5      | 18 and 1  | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:43 |
| 19 | L20 | 28     | (phenol or alkylphenol or Sylphenol) same (formaldehyde or paraformaldehyde or formalin) same pressure and 1 and 17                       | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:28 |
| 20 | L21 | 97     | (phenol or alkylphenol or Sylphenol) same (formaldehyde or paraformaldehyde or formalin) same pressure and 1                              | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:45 |

|    | L # | Hits | Search Text   | DBs  | Time Stamp          |
|----|-----|------|---|--|---------------------|
| 21 | L22 | 39   | resol\$2 near10 pressure and<br>1   | USPAT;<br>US-PGF<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:47 |
| 22 | L16 | 38   | phenol near5 modified near5<br>rosin adj ester  | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:39 |
| 23 | L23 | 8    | sano.in. and phenol.ti.   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:49 |
| 24 | L24 | 941  | (phenol or alkylphenol or<br>\$ylphenol) same<br>(formaldehyde or<br>paraformaldehyde or<br>formalin) and pressure and<br>1 | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:51 |
| 25 | L25 | 442  | 24 and 17   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:51 |

|    | L # | Hits | Search Text                        | DBs  | Time Stamp          |
|----|-----|------|------------------------------------|--|---------------------|
| 26 | L26 | 137  | 25 and ink                         | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>06:51 |
| 27 | L27 | 50   | 15 and resol                       | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:25 |
| 28 | L28 | 150  | phenol\$2 near3 rosin adj<br>ester | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:24 |
| 29 | L29 | 11   | 28 and 1                           | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:25 |
| 30 | L30 | 139  | rosin near10 resol                 | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:25 |

|    | L # | Hits | Search Text  | DBs  | Time Stamp          |
|----|-----|------|--|--|---------------------|
| 31 | L31 | 4    | 30 and 1   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:25 |
| 32 | L32 | 40   | 15 and resole  | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:25 |
| 33 | L33 | 56   | (phenol or alkylphenol or<br>\$ylphenol) same<br>(formaldehyde or<br>paraformaldehyde or<br>formalin) same (atm! or<br>atmosphere or pa! or mpa!)<br>and 1 | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:29 |
| 34 | L35 | 21   | (greater or above) near5<br>atmospheric near10 (phenol<br>or phenolic or resol or<br>resole)   | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:32 |
| 35 | L36 | 0    | 5756640.URPN.  | USPAT  | 2002/10/08<br>07:33 |
| 36 | L34 | 176  | increas\$ near5 pressure<br>near10 (phenol or phenolic<br>or resol or resole)  | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:35 |

|    | L # | Hits | Search Text  | DBs  | Time Stamp          |
|----|-----|------|--|--|---------------------|
| 37 | L38 | 456  | react\$3 near10 (phenol or alkylphenol or \$ylphenol) near10 (formaldehyde or paraformaldehyde or formalin) same pressure  | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:50 |
| 38 | L37 | 9    | phenol near5 modified near5 rosin adj ester  | USOCR  | 2002/10/08<br>07:44 |
| 39 | L39 | 62   | react\$3 near10 (phenol or alkylphenol or \$ylphenol) near10 (formaldehyde or paraformaldehyde or formalin) same (increas\$3 or high or above or great) near5 pressure | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:46 |
| 40 | L40 | 1    | 5908914.URPN.  | USPAT  | 2002/10/08<br>07:47 |
| 41 | L41 | 94   | react\$3 near10 (phenol or alkylphenol or \$ylphenol) near10 (formaldehyde or paraformaldehyde or formalin) near10 pressure  | USPAT;<br>US-PGP<br>UB;<br>EPO;<br>JPO;<br>DERWEN<br>T;<br>IBM_TD<br>B | 2002/10/08<br>07:50 |